

REMARKS

Claims 1-22 are pending in this application, of which claims 1, 16 and 17 are independent. Reconsideration of the application and the claims is respectfully requested.

Claims 1-3, 6, 8-9, 12-13 and 16-20 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by “Diffusion Tree Restructuring for Indirect Reference Counting” (Dickman). Despite applicant’s explanation in the previous reply, the Examiner maintains the same rejection over Dickman. The Examiner responds to the applicant’s previous arguments by asserting that the claims in the present application recite different intended use of the reference count and depth count in Dickman without a structural difference, and that Dickman is capable of performing the intended use. Applicant respectfully disagrees.

Dickman describes a way to rearrange a set of objects such that some objects become garbage. Dickman proposes that an object tree be reworked from time to time in order to remove intermediate proxies or reference pointers when possible. Dickman’s notion appears to be that if A is altered to point directly to C, and B has no other reason to exist, the proxy in B can be garbage collected. Dickman discloses reworking the arrangement of which objects point to which so as to increase the likelihood of third objects becoming garbage and describes rearranging objects so as to “flatten” a tree. Dickman presumes that once the tree is flattened, a garbage collector will notice that some objects have become garbage and will garbage collect them.

Dickman uses a depth counter to determine when to rearrange the objects. Dickman’s depth counter has the property that any object’s depth counter is always equal to or greater than, by an unspecified amount, the true depth. This is true because depth counters are initialized

whenever a new relationship is established and the only reworking that can happen will be to reduce the true depth of the tree. When Dickman moves a subtree, Dickman updates the depth count of the root of the subtree, but does not attempt to correct the depth counters of other objects in the subtree, so they will have a depth counter value which is higher than reality, that is a true depth count value. To Dickman, however, this is tolerable and does not break his algorithm because the exact value of a depth count is not necessary for his algorithm to work. At no time does Dickman ever use “invalid” values for his depth counters. All objects are assigned a depth when they are created or when they are moved to a new location. The value of a depth counter may be too high, but is never marked “invalid.”

On the other hand, the claims in the present application positively identify some objects as not garbage or candidates for garbage collection processing using a depth value that is maintained for “each of a plurality of objects.” To further clarify what is being claimed, independent claims 1, 16 and 17 are being amended to further recite, “and if the existing depth value associated with the object is an uninitialized value, changing the existing depth value associated with the object to one more than a depth value associated with said another object.” Support for the amendment can be found in paragraphs 34 and 39 of the original specification. Dickman fails to disclose that such a depth value is used to identify an object as a candidate for garbage processing. Contrary to the allegation in the Office Action, Dickman’s depth value cannot be used to identify an object as a candidate for garbage processing as claimed because Dickman does not maintain exact depth values (valid or uninitialized) for each of its objects as explained above. Such a difference is not only a difference in intended use, but also a structural difference. For at least this reason, applicant believes that Dickman does not anticipate independent claims 1, 16 and 17 and their respective dependent claims.

While the above rational also applies to claim 3 by virtue of claim 3's dependency on claim 1, applicant proffers the following additional reason to further distinguish claim 3. Claim 3 recites in part, "a first of the objects is identified for processing when it is determined that a second of the objects previously pointing thereto is no longer pointing thereto, and the depth value of the second object is one less than the depth value of the first object." The Office Action cites Dickman's page 2, column 1, lines 17-19 and page 6, column 2, lines 18-20 as allegedly disclosing that element. Contrarily, page 2, column 1, lines 17-19 appears to provide some background data about the special problems that distributed reference counting collectors face; page 6, column 2, lines 18-20 appears to describe that Dickman's algorithm requires a depth counter and some basic requirements about its semantics. Dickman in those passages (or anywhere else), however, does not disclose or suggest to identify an object for garbage processing if it is determined that a second of the objects previously pointing thereto is no longer pointing thereto, and the depth value of the second object is one less than the depth value of the first object (or one less than the depth value of the first object modulo a maximum depth value, when depth value wrapping is involved). Examiner points to Dickman's passage that states in verbatim, "It follows that a depth indicator is required which satisfies the criteria that descendents have a higher depth than their ancestors" (Dickman, page 6, column 2, lines 18-20), as allegedly reading on the language of claim 3. However, Applicant respectfully disagrees that that passage discloses or suggests that, "a first of the objects is identified for processing when it is determined that a second of the objects previously pointing thereto is no longer pointing thereto, and the depth value of the second object is one less than the depth value of the first object." Rather, that passage of Dickman states that generally a descendent node has higher

depth than its ancestor node, and does not appear to consider a scenario in which a descendent node can have a depth value not higher than its ancestor's.

Claim 3 is being amended to further clarify what is being claimed. Support for the amendment can be found in paragraph 36. Dickman also fails to disclose or suggest, "and the first of the objects is identified as not a garbage collection candidate even when it is determined that the second of the objects previously pointing thereto is no longer pointing thereto and the depth value of the second object is not one less than the depth value of the first object" as recited in claim 3 as amended. For at least these foregoing reasons, Dickman does not anticipate claim 3.


Claims 4-5 and 7 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Dickman and further in view of U.S. Patent Application Publication No.: 2002/0087590 to Bacon et al. ("Bacon"). Bacon as understood by applicant discloses collecting cyclic garbage on reference counting system. However, because Bacon does not make up for which Dickman fails to disclose as discussed above, applicants believe Dickman and Bacon, alone or in combination, do not disclose every element claimed in claims 4-5 and 7 and therefore, those claims are not obvious over Dickman and Bacon.

Claims 10-11 and 14-15 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Dickman and further in view of U.S. Patent No. 6,338,159 Alexander, III et al. ("Alexander"). Alexander as understood by applicant discloses trace information. However, Alexander also does not make up for which Dickman lacks as discussed above. For example, Alexander does not disclose or suggest using a depth counter to determine whether an object is to be processed as garbage. In addition, Alexander does not keep an existing depth value based on validity of the depth value. As in Dickman, Alexander does not distinguish between valid and

invalid depth values because, it appears that in Alexander depth values are always valid and always known. Thus, again, Alexander's depth values exist for different reasons than in claims 10-11 and 14-15. Accordingly, applicant believes Dickman and Alexander, alone or in combination, do not disclose every element claimed in claims 10-11 and 14-15 and therefore, those claims are not obvious over Dickman and Alexander.

This communication is believed to be fully responsive to the Office Action and every effort has been made to place the application in condition for allowance. A favorable Office Action is hereby earnestly solicited. If the Examiner believes a telephone conference might expedite prosecution of this case, it is respectfully requested that he call applicant's attorney at (516) 742-4343.

Respectfully submitted,


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